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GREASEWOOD AS A POISONOUS PLANT.

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DESCRIPTION OF THE PLANT.

Greasewood, sometimes known as "chico," known to the botanists as *Sarcobatus vermiculatus*, is a plant growing very abundantly in parts of the West. It is found from the State of Washington to Montana, from California to Texas, and more or less abundantly in the intervening regions, on alkali soils. The plant is quite generally recognized by stockmen on the western ranges, as its light-colored, scraggly, and spiny branches, with slender, fleshy leaves varying from one-half to 1½ inches in length, easily distinguish it from others which are likely to be found in similar situations. Figure 1 shows branches of the plant with staminate flowers, and Figure 2 shows the growing plant. It belongs to the goosefoot family (Chenopodiaceæ) and is a shrub growing, under favorable circumstances, upward of 9 feet in height, but as ordinarily seen it does not exceed 4 or 5 feet.

A number of other plants in some localities have been known as greasewood. Among these are Chrysothamnus, Gutierrezia, Atriplex, Adenostoma, Covillea, and Ramona. Generally speaking, however, there is little difficulty in recognizing the true greasewood. It is known as an important forage plant, particularly for sheep on the winter range, and is one of the forms of vegetation on which dependence is placed for grazing these animals. While it is generally recognized as a good forage plant, there have been from time to time reports of losses of sheep, presumably from eating the greasewood.

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REPORTS OF STOCK POISONING BY GREASEWOOD.

Apparently the first published statement in regard to its poisonous character was that by Chesnut in 1898 in his preliminary list of poisonous plants. In this statement Chestnut mentions an occurrence of the loss of 1,000 sheep in New Mexico from eating greasewood. Subsequent publications on this plant have been largely based on the statements made by Chesnut in 1898 and in his succeeding



FIG. 1.—Branches of Greasewood (*Sarcobatus vermiculatus*) with staminate flowers. The slender leaves vary from half an inch to an inch and a half long.

publications, in which little was added to the original statement. During the years since these publications were issued, however, repeated reports have been made to officials of the Department of Agriculture of serious losses under some circumstances from greasewood. Several instances came under the personal observation of Dr. J. S. Buckley in 1910 in which there seemed to be no question that the sheep were killed by greasewood.

In the fall of 1920 Dr. S. W. McClure wrote to the department about a loss which had occurred at Harper, Oreg. In October of

that year 1,700 ewes were unloaded at Harper and were turned out and grazed from 2 to 5 o'clock in the afternoon. The next morning 1,000 were found dead. A careful examination of the pasture by Doctor McClure showed that almost the only vegetation there was greasewood. It seems, moreover, that this was the third time that sheep had been killed in this manner in that vicinity.

EXPERIMENTAL WORK.

As the department was in possession of no definite knowledge in regard to the poisonous properties of the plant, these occurrences made it desirable to undertake definite and detailed experiments on greasewood.

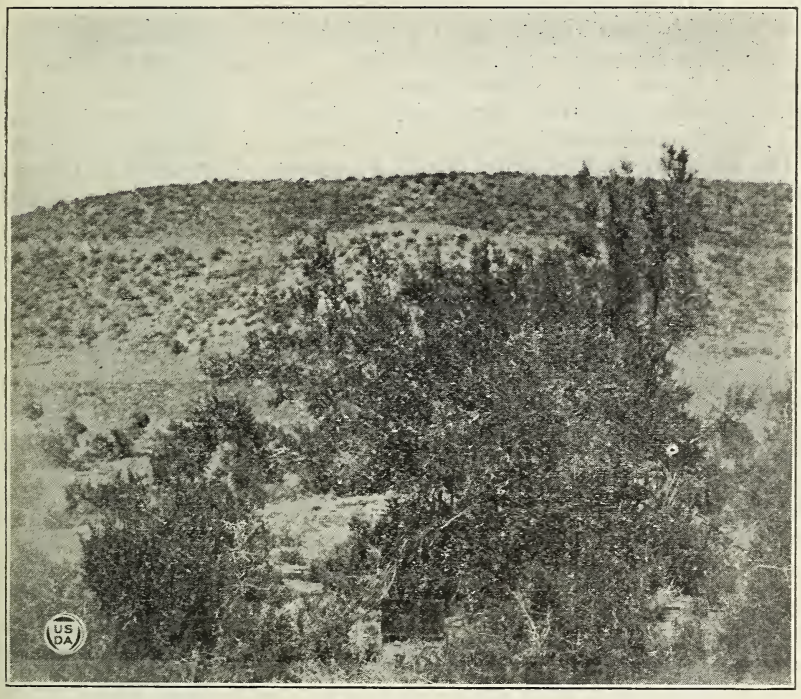


FIG. 2.—Greasewood (*Sarcobatus vermiculatus*) as it appears on western ranges.

During the summers of 1921 and 1922 this work was taken up at the Salina Experiment Station in Utah. While the investigation is not completed, the general results point out clearly the cause of trouble. This circular is a preliminary report, issued for the information of stockmen.

A large number of feedings was made. Part of these were made with the balling gun, in which weighed quantities of the plant were introduced into the stomachs of the animals. Others were made by feeding the plant with hay, and in connection with the chemical work a considerable number of animals received extracts of the plant.

In the autopsies which were made of the eight animals which died, very little was found that could be considered characteristic of this poisoning.

Of those which died following the balling-gun method of feeding, the average time between the administration of the plant and the appearance of symptoms was between 3 and 4 hours, and the average time from the appearance of symptoms to death was about 12 hours.

In regard to the quantity necessary to poison animals, in these experiments it was found that 1.5 pounds or more of green plant per hundredweight of animal would ordinarily produce illness or death, although in some instances as large a quantity as 1.8 pounds per hundredweight of animal was fed without any effect. It is an interesting fact that most of the animals poisoned died, so that it would appear that there was little difference between the doses that caused death and those that caused only sickness. The experiments showed, on the other hand, that animals eating the plant in connection with hay might take very large quantities without any harm. For example, one animal ate 4.2 pounds per hundredweight daily for 34 days without being affected, and this animal ate 8 pounds in about 18 hours. The experiments indicate, then, that if an animal eats the plant somewhat slowly large quantities can be consumed and this may be continued day after day with no injurious effect whatever.

Dr. McClure had reported that the animals which died at Harper, Oreg., died without a struggle, as if under an opiate. Of the animals at the Salina Experiment Station the typical symptoms were depression, weakness, a weak pulse, and in some cases labored respiration. Death was evidently caused by heart failure.

POISONOUS PRINCIPLE.

The poisonous effect of the plant is caused by the oxalates of sodium and potassium. This is an especially interesting discovery, inasmuch as it is ordinarily expected that the poisonous principles of plants will be of an alkaloidal or glucosidal nature. It is evident that if one were to use remedial measures the proper antidote would be soluble salts of calcium. However, a poison which affects an animal so seriously and prostrates it so completely would probably have no antidote which could be of practical use under range conditions.

PRACTICAL CONSIDERATIONS.

So far as experimental work has gone it seems reasonably certain that sheep can be fed on greasewood without much danger of injurious results so long as the feeding is extended over a considerable period of time and, preferably, when some other feed is given with the greasewood. It also seems clear that if extremely hungry animals are grazed where there is little except greasewood results may be expected like those which occurred at Harper, Oreg.

SUMMARY.

While under most conditions greasewood is good forage, under exceptional conditions it may be very destructive to sheep.

Poisoning is due to sodium and potassium oxalates in the plant.

Poisoning takes place only when a considerable quantity of the plant, at least 1.5 pounds to the hundredweight of animal, is eaten in a very short time.

Poisoned animals in most cases die.

Poisoning may be avoided by taking reasonable care that animals do not graze on greasewood when they are very hungry.

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